Appl. No. 09/134,272
Amdt. Dated September 16, 2004
Reply to Office action of June 21, 2004

REMARKS/ARGUMENTS

Claims 4-6, 9, 11, 12, 15-17, and 22-37 are pending in the present application.

This Amendment is in response to the Office Action mailed June 21, 2004. In the Office
Action, the Examiner rejected claims 4-6, 9, 11, 12, 15-17, and 22-37 under 35 U.S.C. §103(a).
Reconsideration in light of the remarks made herein is respectfully requested.

Rejection Under 35 U.S.C. § 103

The Office Action rejected claims 4, 6, 9, 11, 12, 15-17, and 22-37 under 35 U.S.C.
§103(a) as being unpatentable over U.S. Patent No. 5,311,588 issued to Polcyn et al. ("Polcyn")
in view of U.S. Patent No. 6,125,345 issued to Modi et al. ("Modi") and further in view of U.S.
Patent No. 5,841,385 issued to Xie ("Xie"); claims 5 and 24 under 35 U.S.C. §103(a) as being
unpatentable over Polcyn in view of Modi and Xie and further in view of U.S. Patent No.
5,657,422 issued to Janiszewski et al. ("Janiszewski"). Applicant respectfully traverses the
rejection.

First, Applicant respectfully submits that the combinations of Polcyn, Modi and Xie as
well as Polcyn, Modi, Xie, and Janiszewski constitute impermissible hindsight reconstruction.
As aptly stated by the Federal Circuit in *In re Kotzab*, 217 F.3d 1365, 55 U.S.P.Q.2d 1313 (Fed.
Cir. 2000), "to establish obviousness based on a combination of the elements disclosed in the
prior art, *there must be some motivation, suggestion or teaching of the desirability of making the
specific combination that was made by the Applicant.*" Emphasis added. Herein, Applicant
respectfully submits that none of these references provide motivation for determining a peak-to-
mean likelihood ratio or using both short-term and long-term averaged energies as set forth in
claims 6, 12, 15 and 22. Accordingly, Applicant respectfully traverses the grounds for rejection
and respectfully requests the Examiner to withdraw the rejections.

Second, Applicant contends that the Examiner has not met the burden of establishing a
prima facie case of obviousness. As the Examiner is aware, to establish a *prima facie* case of
obviousness, three basic criteria must be met. First, there must be some suggestion or
motivation, either in the references themselves or in the knowledge generally available to one of
ordinary skill in the art, to modify the reference or to combine reference teachings. Second,
there must be a reasonable expectation of success. Finally, the prior art reference (or references
when combined) must teach or suggest all the claim limitations. *MPEP §2143, p. 2100-129 (8th*

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Ed., Rev. 2, May 2004). Applicant respectfully contends that there is no suggestion or motivation to combine their teachings, and thus no *prima facie* case of obviousness has been established.

I. §103(A) REJECTIONS OF INDEPENDENT 6, 12, 15, AND 22:

The Office Action states that Polcyn teaches a first ratio level and an average power level, and Modi teaches confidence measures of likelihood scores and ratios. The Office Action states that it would have been obvious to modify the system of Polcyn to normalize the peak-to-average ratios as suggested by Modi. The Office Action further states that Xie discloses calculating lone-term average energy and short-term average energy and determining if a ratio of the two exceeds a threshold value. The Office Action then concludes that it would have been obvious to one of ordinary skill to modify the system of Polcyn and Modi to implement the averaged energy determinations and calculations as taught by Xie (Office Action, page 4). Applicant respectfully disagrees and contends that the combination of Polcyn, Modi, and Xie does not lead to the claimed invention.

Polcyn discloses a call progress detection circuitry and method. A peak average ratio (PAR) is computed and compared with a threshold to determine the calling condition (Polcyn, Abstract). The PAR is computed as the maximum voltage squared divided by the average power which is the sum of all voltage samples squared divided by the number of samples (Polcyn, col. 16, lines 20-30).

Modi discloses a method and apparatus for discriminative utterance verification using multiple confidence measures. The multiple confidence measure subsystem integrates confidence measures from different and complementary knowledge sources such as spoken utterances, language models, acoustic models to improve the performance of utterance verification (Modi, col. 8, lines 40-45).

Xie discloses a system and method for performing combined digital/analog automatic gain control for improved clipping suppression. A long term gain calculator generates a long term gain adjustment signal from a long term energy average output to maintain the audio input signal within a long term energy average range (Xie, col. 5, lines 51-53). Similarly, a short term gain calculator generates a short term gain adjustment signal from a short term energy average

output to maintain the audio input signal below a short term energy average threshold (Xie, col. 6, lines 43-45). A multiplexer selects either the long-term gain adjustment signal or the short-term gain adjustment signal and outputs a new gain adjustment signal (Xie, col. 7, lines 8-11).

Polcyn, Modi, and Xie, taken alone or in any combination, do not disclose, suggest, or render obvious the claimed invention, including at least (1) determining whether a sum of the short-term averaged energy and a factor is greater than the long-term averaged energy, and (2) determining a peak-to-mean likelihood ratio using maximum and minimum peak-to-mean averaged ratios, as recited in claims 6, 12, 15, and 22.

Polcyn merely discloses computing a peak average ratio (PAR) as the maximum voltage squared divided by the average power. Therefore, the PAR is not the peak-to-mean likelihood ratio as recited because it does not use the maximum average peak-to-mean ratio and a minimum averaged peak-to-mean ratio.

Modi merely discloses a likelihood ratio as a ratio between the probability density function of the null hypothesis and the probability density function of the alternative hypotheses (Modi, col. 8, lines 10-18). The null hypothesis is the hypothesis that a given keyword exists in a segment of speech, and the alternative hypothesis is one in which the given keyword does not exist (Modi, col. 8, lines 2-9). Modi's likelihood ratio, therefore, merely represents probabilities of hypotheses, not related to sampled signals in an audio frame. In contrast, the peak-to-mean likelihood ratio, as recited in claims 6, 12, 15, and 22, is a ratio between the a maximum signal and summation of the values of all sampled signals for the current frame (See, for example, specification, page 14, lines 9-17). Furthermore, Modi's technique is used to improve performance of utterance verification, not to detect voice activity.

Xie merely discloses computing long-term and short-term adjustment signals to keep the input signal within some threshold for gain control purposes, not to detect voice activity. Furthermore, only one of the two is selected as a gain adjustment signal. Since Xie explicitly teaches that either the long-term gain adjustment signal or the short-term gain adjustment signal is selected (Xie, col. 7, lines 8-11), Xie does not teach or suggest using both of the long-term and short-term averaged energies together. Therefore, Xie effectively teaches away from the claimed invention where a sum of the short-term averaged energy and a factor is determined if it is greater than the long-term averaged energy.

In summary, since neither <u>Polcyn</u> nor <u>Modi</u> discloses or suggest a peak-to-mean likelihood ratio, and <u>Xie</u> teaches away from using both the short-term and long-term averaged energies, there is no motivation to combine them in rejecting independent claims 6, 12, 15, 22 and their respective dependent claims

Therefore, Applicant believes that independent claims 6, 12, 15, 22 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejection under 35 U.S.C. §103(a) be withdrawn.

II. §103(A) REJECTIONS OF DEPENDENT CLAIM 5 AND 24:

The Office Action states that neither <u>Polcyn</u>, <u>Modi</u>, nor <u>Xie</u> discloses weighted average, but <u>Janiszewski</u> discloses using a smoothing constant in calculating signal estimates and setting the smoothing constant to provide for acceptable frame averaging (Office Action, page 4, paragraph 7). The Office Action further states that it would have been obvious to one of ordinary skill to modify the voice detection system of <u>Polcyn</u>, <u>Modi</u>, and <u>Xie</u> to conduct a weighted average by using a smoothing constant as taught by <u>Janiszewski</u> (Office Action, page 5). Applicant respectfully disagrees and contends that their combination of does not lead to the claimed invention.

<u>Polcyn</u>, <u>Modi</u>, and <u>Xie</u> are discussed as above.

<u>Janiszewski</u> discloses a voice activity detection driven noise remediator. If there is not a large increase of frame energy over a short time period, the noise estimate is determined using a smoothing constant which is set to provide acceptable frame averaging (<u>Janiszewski</u>, col. 6, lines 1-8).

<u>Polcyn</u>, <u>Modi</u>, <u>Xie</u>, and <u>Janiszewski</u>, taken alone or in any combination, do not disclose, suggest, or render obvious the claimed invention, including at least (1) determining whether a sum of the short-term averaged energy and a factor is greater than the long-term averaged energy, (2) determining a peak-to-mean likelihood ratio using maximum and minimum peak-to-mean averaged ratios as recited in claims 6, 12, 15, and 22, and (3) conducting a weighted average of the energy of the current audio frame and the short-term averaged energy for the prior audio frame as recited in claims 5 and 24.

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As discussed above, the combination of Polcyn, Modi, and Xie fails to suggest (1) and (2). With regard to (3), Janiszewski merely discloses determining a noise estimate using a smoothing constant for frame averaging. The noise estimate N[m] is based on the average frame energy e[m] and the noise estimate value N[m-1], not on the current audio frame and the prior audio frame. Furthermore, the noise estimate is related to the noise component of the signal, not the short-term averaged energy for the audio frame.

Therefore, Applicant believes that dependent claims 5 and 25 are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejection under 35 U.S.C. §103(a) be withdrawn.

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Conclusion

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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Dated: September 16, 2004   By

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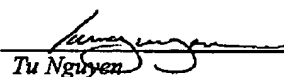
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